A POSSIBLE EXPLANATION FOR ANOMALOUS LUNAR PALEOINTENSITY VALUES MEASURED FOR APOLLO SAMPLE 62235. R. Nelson[1], C. Cournéde[2], I. Garrick-Bethell[1,3], [1]University of California, Santa Cruz (rcnelson@ucsc.edu), [2]University of Minnesota, Twin Cities, [3]Kyung Hee University, Korea.

The past existence of a lunar dynamo has been established based on several decades of analysis of crustal magnetism and Apollo samples. Theoretical estimates of the lunar dynamo paleointensity yield a maximum of ~12 μT [1], with several μT more likely. However, some paleointensity measurements from Apollo samples recorded much higher paleointensities. One sample in particular, Apollo Sample 62235, has a measured paleointensity of >100 μT, with an age of ~3.5 Ga [2]. This is currently the highest paleointensity found in any Apollo sample [1].

Here we propose that the magnetism measured in Sample 62235 is not natural, but rather a TRM (Thermal Remanent Magnetization) acquired at Johnson Space Center when the sample was cut for preparation by a saw blade. Friction in the blade may have caused the sample to heat, causing a TRM to be acquired by the sample, replacing the original magnetization. This has previously been demonstrated for sample 15015 [3]. If this is the case, one would expect the magnetization within the sample to decrease with distance from the saw cut face.

To assess this possibility, we divided sample 62235 into 4 subsamples, and the paleointensity for each subsample was measured via ARM (Anhysteretic Remnant Magnetization) which is used as a proxy for TRM acquisition. Paleointensity measurements on 62235 were performed at the Paleomagnetic Lab at University of California, Santa Cruz.

Results from ARM measurements show very high (>100 μT) paleointensities, confirming previous findings. However, we also observe a slight decrease in the paleointensity of 62235 subsamples as the distance from the saw cut face increases (Fig. 1). These data suggest that the high paleointensity values of Apollo sample 62235 may have been artificially applied instead of naturally acquired, and that the anomalously high values may not need be explained by a lunar dynamo. We are performing additional measurements to further test this hypothesis.

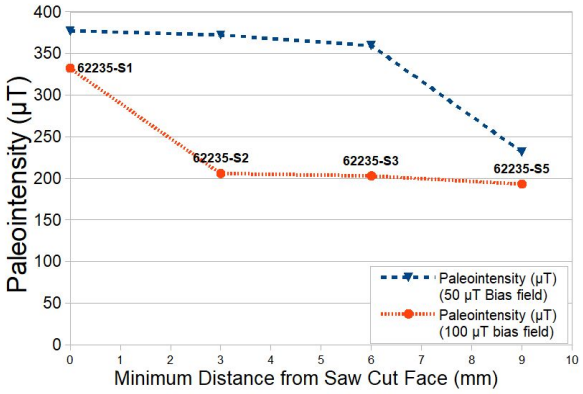

Figure 1: Paleointensities for subsamples of 62235, measured via ARM demagnetization [4]. Decreasing paleointensity with distance from the saw cut face can be seen for two bias fields (DC fields). Paleointensities were determined via averaging of multiple AF demagnetization measurements at AF fields (AC fields) of ascending intensity, from 0 to 200 mT.

References: [1] Weiss, B. P., & Tikoo, S. M. (2014). *Science* 346, 1246753. [2] Lawrence, K., et al. (2008). *PEPI* 168, 71. [3] Wang, H., et al. (2017). *LPSC* 48, 1439. [4] Garrick-Bethell et al. (2017), JGR 122, 76.